DC Fire & EMS Special Operations:
Chemical & Biological Emergencies
Nerve Agents/Organophosphate Poisoning

Note Well: *This protocol is designed to address treatment modalities for adults exposed to nerve agents.*

I. Background

Units responding to an accidental release or consequences of an intentional release are instructed to follow the directions and SOP's established by the Hazardous Material Unit. In the event of patient(s), the EMS providers are to give no hands on treatment until the patients are "clean". The exception to this would be for EMS/ERT members who are trained to care for patients in the exclusion zones.

The Haz-Mat Officer, EMS-16, and Rapid12 will be responsible for patient care in the exclusion zone and for the triage of patients who are decontaminated. Normally, patients are moved through the decon line prior to ALS interventions. In instances of Nerve Agents GA, GB, GD, GF, and VX it is imperative to begin treatment as soon as possible from the time of exposure.

DC Fire & EMS Special Operations: Chemical & Biological Emergencies Nerve Agents/Organophosphate Poisoning

Agent/Forms	*Latency Period*	*Initial Symptoms*	*Initial Medical Management*	*Contact Risk*	*Precautions*
Nerve Agents (Sarin, Soman, Tabun, VX)/Liquid, vapor aerosol	Minutes to hours	Miosis, salivation, rhinorrhea, sweating, wheezing and chest tightness, dyspnea, cramping, diarrhea, fasciculations, spasms, twitching, paralysis, coma, seizures	**Atropine** 6mg (Peds 15-25 ug/kg) IM/IV + **Pralidoxime CL (2-PAMCL)** 600-1000 mg Q3-5min PRN; **Diazepam** 10mg slow IVP PRN Sz; mechanical ventilator PRN, remove any residual agent from skin with soap and water	High (2), avoid contact with agent or inhalation of fumes trapped in patient's clothing	Maximum available protection (2), respirator(4)
Vesicants (Mustard, Lewisite, Phosgene, oxime)/vapor, liquid	Minutes to hours	Burning/itching/stinging of skin w/ erythema & blisters; redness and burning of eyes, lid spasm, photophobia; nasal irritation and bleeding, productive cough	Remove residual agent with 1 part bleach in 9 parts water and rinse with copious water. Supportive care. In **Lewisite use BAL** in oil 4mg deep IM Q4h x 3 doses (Q2h in severe poisoning). **Limit IV fluids.** Analgesics	Low, avoid contact with agent or inhalation of fumes	Maximum available protection (2), respirator(4)
Pulmonary agents (chlorine, phosgene, diphosgene, PFIB)/gas	4-24 hrs	Eye, nasal and oral irritation, possible cough, substernal ache &/or pressure. Progress to dyspnea, rales, pulmonary edema	Supportive with IV fluids, O_2, manage airway secretions, intubation, PEEP, observation for at 24-hours	Low to none	Standard (3)
Cyanide (HCN or CNCl), vapor, liquid	Seconds - minutes	Gasping, seizure, coma, respiratory arrest, cardiac arrest. Cyanosis is rare	**100% O_2**, CPR, intubation & mechanical ventilation, **amyl nitrate** via inhalation or **3% Sodium nitrate** 10ml IV, followed by **25% Na thiosulfate** 50ml IV. Inject each over 3-5 minutes	Low to none. Avoid contact with victim's wet clothing (2)	Standard (3)

(1) Each military **Mark I** kit contains Atropine 2mg and 2-PAMCl 600mg in separate autoinjectors
(2) Assumes absent or incomplete decontamination prior to hospital. In fully decontaminated patients use only Standard Precautions
(3) Standard Precautions - gloves and frequent hand washing. For possibility of splashes of fluids wear gown, mask and eye protection
(4) Respirator - full face with organic vapor filters, PAPR or Self-Contained Breathing Apparatus

Chemical Agents From An Industrial or Agricultural Source					
Agent/Forms	Latency Period	Initial Symptoms	Initial Medical Management	Contact Risk	Precautions
Anhydrous ammonia (NH_3), hydrochloric acid (HCl), sulfur dioxide (SO_2)/ gas, mist, liquid	4-24 hrs	Eye, nasal, oral & upper airway irritation/burns; hoarseness; possible stridor, cough & wheezing. Increased concentration &/or increased exposure can act like above pulmonary agents	Supportive care; thoroughly rinse victim if not already done; stabilize/protect airway & manage secretions; O_2;intubation if needed, mechanical ventilation & PEEP if necessary; observation for at least 24 hours	Low to none. Avoid contact with residual liquid	Standard (3)
Hydrogen sulfide (H_2S)	Minutes	Gasping, hyperpnea, coma, apnea; possible wheezing, rales & pulmonary edema	**100% O_2, CPR**, intubation & mechanical ventilation if needed, **Sodium bicarb** ($NaHCO_3$) by IV infusion may be helpful	Low to none	Standard (3)

(3) Standard Precautions - gloves and frequent hand washing. For possibility of splashes of fluids wear gown, mask and eye protection

II. General Indicators of a Nerve Agent Incident

1. Dead animals/birds/fish: not just an occasional road-kill, but numerous and unexplained.

2. Unusual Liquid droplets: numerous surfaces exhibit oily droplets/film, numerous water surfaces have an oily film.

3. Unexplained odors: odors that are completely out of character with their surroundings.

4. Low lying clouds/fog like conditions that is not explained by its surroundings.

5. Mass Casualties: Numerous individuals exhibiting unexplained serious health problems ranging from nausea to disorientation to difficulty in breathing to convulsions, to death.

III. Clinical Indicators

1. After a patient has been exposed to a nerve agent, his/her symptoms may range from minimal to life threatening.

2. Initial Findings

   A. Dimness of vision (pinpointing of pupils, moisis).

   B. Running nose (Rhinorrhea).

   C. Localized sweating.

3. Advanced Findings

   A. Increased salivation, tearing and sweating.

   B. Headaches, dizziness, altered mental status, exhaustion, shortness of breath.

   C. Tightness in chest.

   D. Nausea, vomiting.

   E. Cramps.

   F. Involuntary defecation and urination.

IV. Advanced Life Support Providers

1. The recommended antidote for Nerve Gas exposures is an initial dose of Atropine 2.0 mg IM.

   A. This is followed by 2-PAM Chloride 600 mg IM.

   B. In the event of convulsions administer Diazapam 10 mg IM.

   C. These items are located in the Mark I kits.

2. The following are guidelines for when and how much antidote is given.

   A. Mild Symptoms

      i. Miosis alone.
         a. Eye pain is treated later.
         b. No treatment.

      ii. Rhinorrhea (if plentiful and discomfort) or Shortness of Breath (if mild).
         a. Atropine 2.0 mg IM.
         b. 2-PAM CL. 600 mg IM.

   B. Moderate Symptoms

      i. Shortness of Breath (if moderate).
         a. Atropine 2.0 mg IM every 10 minutes.
         b. 2-PAM CL. 600 mg IM every 10 minutes.

> ***Note Well:*** *If no change, move to severe category.*

IV. Advanced Life Support Providers (continued)

C. Severe Symptoms

i. Unconscious, convulsing, severe shortness of breath
   a. Atropine 2.0 mg IM every 10 minutes until reversal of symptoms
   b. If no changes continue with 2-PAM CL IM up to 1800 mg .
   c. Diazepam 10 mg IM as necessary.

3. The Nerve Agent Kit (Mark I) that is available to the agency will consist of auto injectors. When using these injector normal IM sites will be used and the auto injectors must be held in place for 10 seconds per injection. Most patients will benefit from 1 or 2 doses of the antidote.

A. Atropine - 2.0 mg per injector.

B. 2-PAM CL - 600 mg per injector.

Note Well: *2-PAM CL may cause hypertension in the elderly patient*

Note Well: *Only members who have received training to use the Antidote kits will be permitted to administer these auto injectors.*

V. The Following Options are Available by Medical Control Only

1. Poison Control may be contacted at 1-800-222-1222 or 202-625-3333. They may be utilized as Medical Control if contacted through the Med Control radio as Hospital 11.

VI. Decontamination Procedures

1. Decontamination procedures will be performed by Haz-Mat personnel prior to treatment and transport by EMS personnel.

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